NDIA Security Technology Symposium

An Overview of Issues and Challenges

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OVERVIEW

- **Presidential Decision Document (PDD) - 63 and the Critical Infrastructure Protection R&D Program**
- **The “New” Issue: Interdependencies**
- **Some Considerations and Constraints**
- **Where We’re Heading…**

MEETING THE R&D CHALLENGES OF PDD-63

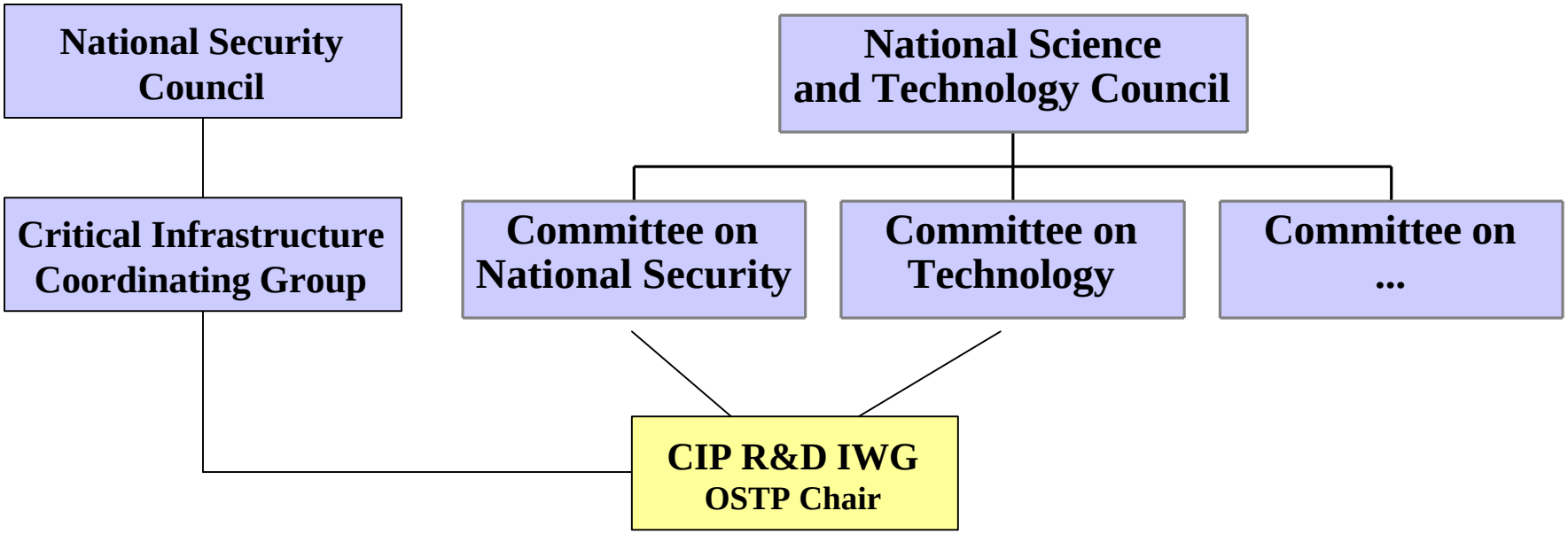
- **President Clinton issued PDD-63 on May 22, 1998 to ensure the robust, reliable operation of our nation's critical infrastructures**
- **PDD-63 key milestones:**
  - **2000: Initial operational capability**
  - **May 2003: achieve and maintain capability to protect nation's critical infrastructures**
- **R&D can do little to meet these short-term goals**
- **R&D <u>essential</u> to maintaining these goals beyond 2003**

ORGANIZING TO MEET THE PRESIDENT'S CHALLENGE

- **White Paper on PDD-63: "OSTP shall be responsible for coordinating research and development agendas and programs for the government through the National Science and Technology Council."**

  President Clinton, May 22, 1998

- **CIP R&D IWG formed in March 1998**



THE FEDERAL R&D RESPONSE TO THE PRESIDENT'S CHALLENGE

Federal CIP and Related R&D FY2000 Funding

FY98 Actual	FY99 Actual	FY00 Enacted	FY01 President's Budget
$406 M	450	461	606

- FY01 budget submission contains substantial R&D increase (31%)
- FY01 R&D budget is about 1/3 of overall critical infrastructure protection program funding

THE "NEW" ISSUE: INFRASTRUCTURE INTERDEPENDENCIES

History Lesson

- **Early references to infrastructure interdependencies can be found in pre- WWI French and German military writings**
- **1930s – Army Air Corps Tactical School developed "Industrial Web" theory**
- **WWII - US air campaign plans based heavily upon "industrial web" concepts**

The importance of interdependencies was recognized - and exploited militarily - over 60 years ago!

WHAT'S NEW TODAY?

Mutual dependence and the interconnectedness … lead to the possibility that our infrastructures may be vulnerable in ways they never have been before.

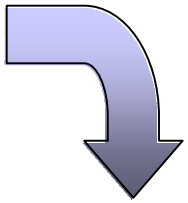
A series of incidents … could interact (cascade) across critical infrastructures to degrade the service upon which all depend.

Intentional exploitation of these new vulnerabilities (i.e., interdependencies) could have severe consequences for our economy, security, and way of life.

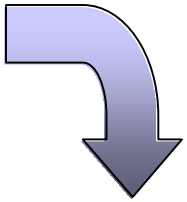
Report of the President's Commission on Critical Infrastructure Protection, October 1997

FRAMING THE NEW ISSUE

- **Users and Applications**
  - *Consequence Management*
  - *Vulnerability Analyses*
  - *Business Continuity*



- **Models and Simulations**
  - *Nodal analyses*
  - *Agent-based models*
  - *Scaling/databases/granularity*
  - *Legacy codes*
  - *Protocols*



- **Enabling Technologies**
  - *Statistical analyses*
  - *Complex adaptive systems*
  - *Emergence/order*

SOME CONSIDERATIONS AND CONSTRAINTS

- **Current state of understanding**
  - **Maturity of our fundamental comprehension of the interdependencies issue**
  - **State of modeling, simulation, databases, etc.**
- **Level and intensity of existing R&D**
  - **Content and direction of existing R&D portfolios**
  - **Budgetary "interconnectivities"**
- **Cooperation and collaboration (government, industry, academia)**
- **Human resources issues**
  - **Base of existing researchers in this field**
  - **Academic production of graduate-level researchers**

SOME CONSIDERATIONS AND CONSTRAINTS

- **Data availability and sharing**
  - **Industry owned and operated infrastructures**
  - **Trust**
  - **Proprietary and sensitive information/FOIA concerns**
- **Security concerns**
- **Raising awareness and "education"**
- **Overlapping authorities and responsibilities**
- **Policy**
  - **Requirements/regulations**
  - **Unintended consequences**

WHERE WE'RE HEADING…

- **A vision of infrastructures immune to interdependency-related failures…**
  - **… A detailed understanding of interdependencies among the infrastructures and their operational implications**
  - **… New technologies, processes, and best practices to contain, dissipate, and mitigate such disruptions**
- **A goal of a set of robust, dynamic policy/analytic/management tools to address interdependency issues**
- **A strong, constructive dialog among government, industry, and academia on interdependencies-related issues**

Questions?